Epitomes

Important Advances in Clinical Medicine

Nuclear Medicine

The Scientific Board of the California Medical Association presents the following inventory of items of progress in nuclear medicine. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist busy practitioners, students, research workers or scholars to stay abreast of these items of progress in nuclear medicine that have recently achieved a substantial degree of authoritative acceptance, whether in their own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Nuclear Medicine of the California Medical Association and the summaries were prepared under its direction.

Reprint requests to Division of Scientific and Educational Activities, California Medical Association, 44 Gough Street, San Francisco, CA 94103

The Role of Nuclear and Ultrasonic Thyroid Imaging

THE MANAGEMENT of thyroid nodules is troublesome because of the low but significant incidence of thyroid cancer in them and because there is not always a clear advantage in the risk of a definitive diagnosis by means of a surgical procedure versus the risk of overlooking a malignancy. An unnecessary operation can be obviated by using nonsurgical diagnostic procedures to identify those cases wherein the likelihood of malignancy is low. Noninvasive radionuclide scintigraphy and ultrasonography are almost universally available and can aid in such differentiation.

Thyroid scintigraphy identifies the 20% to 25% of thyroid nodules that are of equal or greater function than adjacent healthy thyroid. These nodules have such a low incidence of malignancy that a surgical procedure is not indicated. A solitary inactive nodule has a 10% to 30% chance of being malignant. A palpable nodule and scan must be correlated at the time of scanning to detect the nodule and accurately identify its activity. Sodium iodide I 123 and sodium pertechnetate Tc 99m are presently the radionuclides of choice.

Diagnostic ultrasound identifies the 10% to 15% of nodules that are purely cystic. These are rarely malignant. High-resolution real-time ultrasound has a greater ability to differentiate purely cystic from mixed but predominantly cystic nodules.

Because a radionuclide study has the potential to identify a larger population that does not need surgical intervention, it should be the imaging procedure of choice unless there is a contraindication to the small amount of radiation exposure. The remaining population (those with cold nodules) can be further evaluated by the use of ultrasound, thereby reducing the need for invasive procedures—that is, needle biopsy or surgical procedure or both—by 25% to 35%.

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Assessment of Liver Lesions Using Single-Photon Emission Computed Tomography

CONVENTIONAL LIVER SCINTIGRAPHY has been used extensively for the evaluation of focal and diffuse hepatic disease. The procedure is safe, accurate, very reproducible and widely available; overall accuracy for focal liver disease is about 80% in most published series. The technique is somewhat limited, however, by the relative lack of resolution of most defects less than 2 cm in diameter, especially deeper within the liver. Computed tomography (CT) and ultrasound typically can resolve 1-cm hepatic lesions and are most accurate nearer the center of the liver where conventional nuclear imaging is least sensitive.

Single-photon emission CT is a new technique available for liver imaging. The method requires a special γ-camera with a yoke configuration that allows the